

CLAIMS

WHAT IS CLAIMED IS:

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1. A handheld wireless communications device, comprising:

a first antenna;

a second antenna;

a switching module coupled to the first antenna and to the second antenna; and

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a global positioning system (GPS) module coupled to the first antenna or the second antenna via the switching module,

wherein the switching module is adapted to couple the GPS module to the first antenna or the second antenna as a function of a GPS reception characteristic of the first antenna or the second antenna.

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2. The wireless communications device according to claim 1,

wherein the switching module includes a diversity switch, and

wherein the GPS module is coupled to the first antenna or the second antenna via the diversity switch.

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3. The wireless communications device according to claim 2, further comprising:

a controller coupled to the GPS module and the switching module.

4. The wireless communications device according to claim 3, wherein the GPS reception characteristic is determined for a particular GPS frequency employed by the GPS module.

5. The wireless communications device according to claim 3, wherein the controller includes a mobile station modem (MSM).

6. The wireless communications device according to claim 1, wherein the GPS reception characteristic includes GPS signal strength, GPS signal clarity or GPS bit error rate (BER).

7. The wireless communications device according to claim 1, wherein the first antenna is not disposed in a same direction as the second antenna.

8. The wireless communications device according to claim 1, wherein the first antenna is disposed approximately orthogonally with respect to the second antenna.

9. The wireless communications device according to claim 1, wherein the GPS module includes a matching circuit and a low noise amplifier.

10. The wireless communications device according to claim 9, wherein the matching circuit optimizes GPS signal characteristics over the first antenna or the second antenna.

5 11. The wireless communications device according to claim 9, wherein the matching circuit optimizes GPS signal strength over the first antenna or the second antenna.

10 12. The wireless communications device according to claim 1, further comprising:

a duplexer coupled to the switching module;

a receiver module coupled to the duplexer; and

a transmitter module coupled to the duplexer,

15 wherein the switching module is adapted to couple the duplexer to the first antenna or the second antenna as a function of a communications reception characteristic or a communications transmission characteristic of the first antenna or the second antenna.

20 13. The wireless communications device according to claim 12, wherein the switching module is adapted to couple, via the duplexer, the receiver module or the transmitter module to the first antenna or the second antenna as a function of the communications reception characteristic or the communications transmission

characteristic of the first antenna or the second antenna.

14. The wireless communications device according to claim 12, wherein the switching module is structured to couple simultaneously the duplexer and the GPS module to different antennas.

15. The wireless communications device according to claim 1, further comprising:

a duplexer coupled to the switching module;

a first communications band module coupled to the duplexer; and

a second communications band module coupled to the duplexer,

wherein the switching module is adapted to couple the duplexer to the first antenna or the second antenna as a function of a communications reception characteristic or a communications transmission characteristic of the first antenna or the second antenna.

16. The wireless communications device according to claim 15, wherein the switching module is adapted to couple, via the duplexer, the first communications band module or the second communications band module to the first antenna or the second antenna as a function of the communications reception characteristic or the communications transmission characteristic of the first antenna or the second antenna.

17. The wireless communications device according to claim 16, wherein the

switching module is structured to couple simultaneously the diplexer and the GPS module to different antennas.

18. The wireless communications device according to claim 15,
5 wherein the first communications band module includes cellular band communications circuitry, and

wherein the second communications band module includes PCS band communications circuitry.

10 19. A system for providing wireless communications, comprising:
a first antenna;
a second antenna;
a GPS module;
means for selecting one of the first antenna or the second antenna for use in
15 receiving GPS information as a function of GPS receiving characteristics of the first antenna or the second antenna; and

means for coupling the received GPS information to a GPS module via one of the first antenna or the second antenna as selected by the selecting means.

20 20. The system according to claim 19, further comprising:
means for coupling a communications transmitter module or a communications receiver module to the first antenna or the second antenna as selected by means for

selecting the first antenna or the second antenna as a function of communications transmission characteristics or communications reception characteristics of the first antenna or the second antenna.

5 21. The system according to claim 20, wherein the GPS module and the communications transmitter module or the communications receiver module simultaneously use different antennas.

10 22. The system according to claim 19, further comprising:
 means for communicating over a first communications band;
 means for communicating over a second communications band; and
 means for coupling communications information over the first communications band or the second communications band via the first antenna or the second antenna as selected by means for selecting the first antenna or the second antenna as a function of
15 communications reception characteristics or communications transmission characteristics of the first antenna or the second antenna.

20 23. The system according to claim 22, wherein the GPS module and the first communications band means or the second communications band means simultaneously use different antennas.

24. A method for providing a global positioning system (GPS) enabled

wireless communications device, comprising the steps of:

(a) selecting a first antenna or a second antenna for use in receiving GPS information as a function of GPS receiving characteristics of the first antenna or the second antenna; and

5 (b) coupling the GPS information to a GPS signal processor via one of the first antenna or the second antenna as selected in step (a).

25. The method according to claim 24, further comprising the step of:

10 (c) simultaneously receiving the GPS information and two-way wireless communications information over respective antennas via a diversity switch.

26. A method for providing global positioning system (GPS) enabled wireless communications, comprising the steps of:

15 (a) coupling a GPS module to a first antenna via a diversity switch;
(b) evaluating a GPS reception characteristic of the first antenna;
(c) coupling the GPS module to a second antenna via the diversity switch;
(d) evaluating the GPS reception characteristic of the second antenna; and
(e) coupling the GPS module to the second antenna instead of the first antenna via the diversity switch.

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27. The method according to claim 26, wherein step (e) includes the step of coupling the GPS module to the second antenna instead of the first antenna via the

diversity switch if the GPS reception characteristic of the second antenna is better than the GPS reception characteristic of the first antenna.

28. The method according to claim 26, wherein step (e) includes the step of
5 coupling the GPS module to the second antenna instead of the first antenna via the diversity switch if the GPS reception characteristic of the first antenna becomes poor.

29. The method according to claim 26, wherein step (b) includes the step of
evaluating when the GPS reception characteristic of the first antenna reaches a particular
10 threshold value.

30. The method according to claim 26, wherein step (c) includes the step of
temporarily coupling the GPS module to the second antenna via the diversity switch to
sample the GPS signal for use in step (d).
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31. The method according to claim 26, further comprising the steps of:
(f) evaluating a communications transmission characteristic or a
communications reception characteristic of the first antenna or the second antenna; and
(g) coupling a duplexer to one of the first antenna or the second antenna via
20 the diversity switch as a function of the evaluated communications transmission
characteristic or the evaluated communications reception characteristic of the first antenna
or the second antenna.

32. The method according to claim 31, further comprising the step of:

(i) simultaneously coupling the duplexer and the GPS module to different antennas via the diversity switch.

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33. The method according to claim 26, further comprising the steps of:

(f) evaluating a communications transmission characteristic or a communications reception characteristic of the first antenna or the second antenna; and

(g) coupling a diplexer to one of the first antenna or the second antenna via the diversity switch as a function of the evaluated communications transmission characteristic or the evaluated communications reception characteristic of the first antenna or the second antenna.

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34. The method according to claim 33, further comprising the step of:

(i) simultaneously coupling the duplexer and the GPS module to different antennas via the diversity switch.

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35. The method according to claim 33, further comprising the step of:

(i) coupling cellular band communications circuitry or personal communications services (PCS) band communications circuitry to the first antenna or the second antenna via the diplexer and the diversity switch.

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